VI. A SYNOPSIS OF THE GENUS METROBATES UHLER. (Hemiptera: Gerridæ).

By C. J. Drake and H. M. Harris.

(Plate II)

Water-striders of the genus *Metrobates*, subfamily *Halobatinæ*, family Gerridæ, have the body comparatively short and broad and the inner margins of the eyes convexly rounded. From other halobatinoid genera they may be distinguished by the somewhat flattened body and the characters of the antennæ and legs. The antennæ are almost as long as the entire body, segment I being nearly as long as, or even a little longer than, the remaining three segments taken together. Sometimes individuals of the same species show a slight degree of variation in lengths of both antennæ and legs. The first segment of the anterior tarsus is very short, being only about one-fourth of the length of the second. In addition the femora of the hind legs are about twice as long as the tibiæ, and also are much longer than the femora of the middle legs. The front legs are much shorter and stouter and somewhat hairy. The first tarsal segment is beset beneath with a row of five to ten long setaceous hairs, which are progressively shortened from the base to the apex.

The species of *Metrobates* exhibit a marked degree of both sexual dimorphism and pterygodimorphism. In the males the antennæ are stout and bear special structures and clothing, whereas they are comparatively simple in the females. The more strongly developed armature of the second and third antennal segments and the row of very long bristly hairs beneath on the first in all five species, and also that of the front femora in *denticornis* (Champ.) and that just in front of the middle legs in *spissus*, sp. nov., represent special structures peculiar to the male sex. Alate individuals are known in four species and probably occur in the other members of the genus. In *Metrobates*, as in a number of other genera of *Halobatinæ*, the wings are frequently mutilated, being broken off near their bases by the insects themselves. This deälating operation takes place in both sexes and as a result many specimens in collections have artificially shortened

wings with truncate and ragged tips. In the five known species, including the two described below as new, the male claspers are very distinctive and reliable specific characters. As the essential characters of Champion's *Trepobatopsis* are the same as those of *Metrobates* the writers are here considering the two groups as synonymous.

In habits the members of the genus are gregarious. They are confined entirely to the surface of inland waters, inhabiting lakes, creeks, and rivers; and probably being more at home in the quiet waters of the broad expanses of slow-moving streams and in secluded coves of lakes. Although not uncommon, they are decidedly local in occurrence, but do not live in such compact schools as do the *Rhagovelicæ*. On the smaller lakes *M. hesperius* Uhler may sometimes be found in immense numbers, the surface being densely populated over a considerable area by imagoes and nymphs. For food, they prey largely upon insects, which chance to fall into the water. Very little is known regarding the breeding and hibernating habits and life-cycle of the members of the genus.

This paper is based upon material belonging to the Carnegie Museum, the U. S. National Museum, and the writers. The writers are indebted to Mrs. E. L. Travis for the illustrations. As the structure of the thorax is quite different in the winged and wingless forms of the same species, and as both forms are very infrequently represented in a single collection, the characters used in the key to distinguish the different species apply equally well to either alate or apterous males. Except for *M. hesperius* and *spissus* the structural characters of the females are too comparative for satisfactory keys. The females, however, may be readily identified by comparing with determined specimens, and checking with the descriptions.

Genus METROBATES Uhler, 1871.

Haplotype, *M. hesperius* Uhler.

Metrobates Uhler, Proc. Bost. Soc. Nat. Hist., XIV, 1871, p. 108; *ibid.*, XIX, 1878, p. 437; Kirkaldy, Trans. Amer. Ent. Soc., XXXII, 1906, p. 155; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210; Torre-Bueno, Trans. Amer. Ent. Soc., XXXVII, 1911, pp. 246 and 249; Hungerford, Sci. Bull. Univ. Kan., XXI, No. 17, 1919, p. 113; Van Duzee, Cat. Hemip., 1917, p. 430; Torre-Bueno, Conn. Geol. & Nat. Hist., Surv., Bull. 34, 1923, p. 662; Blatchley, Heter. of E. N. Amer., 1926, p. 986.

Trepobatopsis Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 158.

KEY TO SPECIES

MALES

1. Anterior femora armed below near the middle with a stout downwardly projecting tooth, fig. 3; male clasper as in fig. 4*b*. . *M. denticornis* (Champ.)
   Anterior femora unarmed; male claspers different. 2
2. Mesosternum just in front of the middle legs armed with a stout, slightly recurved, downwardly projecting spine-like tubercle, fig. 1*b*; male claspers as in fig. 4*d*. . . . . *M. spissus*, sp. nov.
   Mesosternum unarmed; male claspers different. 3
3. Intermediate femora and basal portion of tibiæ densely clothed within with long hairs; second segment of antennæ one and one-half times as long as four, fig. 2*a*; male claspers as in fig. 4*a*. . . . . *M. hesperius* Uhler
   Intermediate legs clothed only with pile; second antennal segment scarcely longer than fourth, the third distinctly shorter 4
4. Male clasper long, strongly curved inwardly, somewhat blade-like, pointed, as in fig. 4*c*. . . . . *M. trux* (Torre-Bueno)
   Male clasper short, widest at apex, as in fig. 4*e*. . . . . *M. cubanus*, sp. nov.

Metrobates hesperius Uhler (Pl. II, figs. 2*a* and 4*a*)

Metrobates hesperius Uhler, Proc. Bost. Soc. Nat. Hist., XIV, 1871, p. 109; *ibid.*, Uhler, XIX, 1878, p. 438; Uhler, Stand. Nat. Hist., II, 1884, p. 271; Van Duzee, Can. Ent., XXI, 1889, p. 6; Torre-Bueno, Jour. New York Ent. Soc., XIII, 1905, p. 41; Torre-Bueno, Trans. Amer. Ent. Soc., XXXVII, 1911, p. 249; Torre-Bueno, Can. Ent., XLIII, 1911, p. 228; Parshley, Psyche, XXI, 1914, p. 144; Osborn and Drake, Ohio Jour. Sci., XV, 1915, p. 504; Hungerford, Sci. Bull. Univ. Kan., XXI, 1919, pp. 114 and 119; Parshley, Bost. Soc. Nat. Hist., VII, No. 14, 1917, p. 108; Parshley, Bull. Brook. Ent. Soc., XV, 1920, pp. 67-70; Parshley, Bull. Brook. Ent. Soc., XXIV, 1929, pp. 157-160; Drake, Tech. Pub. No. 16, N. Y. State Col. For., 1922, p. 81; Blatchley, Heterop. E. N. Amer., 1926, p. 980.

Halobatopsis beginni Ashmead, Can. Ent., XXIX, 1897, p. 56.

Antennæ long, black, the basal portion of first segment yellowish brown; first segment a little longer and distinctly stouter in male than in female; second segment one and one-half times as long as the fourth, entirely black. Rostrum more densely clothed with long hair than in the other species. Color somewhat variable, especially the gray or bluish gray markings in the apterous form. Winged form darker, blackish brown, the anterior lobe of pronotum with an orange spot, the bluish stripes wanting.

Length (apterous), 3.40-4.50 mm.; width, 1.70-2.35 mm. Winged form broader and about 5 mm. long. The wingless form is the commoner.

*References to figures all refer to Pl. II, of this volume.

This is the commonest and most widely distributed member of the genus. It may be readily recognized by the characters given in the key. It should also be noted that the antennæ are stouter and longer in *hesperius*, also the first segment in the male is densely clothed beneath with hairs. In the streams and lakes of Eastern North America it is to be not infrequently found in association with species of *Trepobates* and *Rheumatobates* and occasionally with *Tenagogonus*, *Gerris*, and *Rhagovelia*. Specimens have been examined from Maine, New York, New Jersey, Massachusetts, Rhode Island, Maryland, North and South Carolina, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Iowa, Nebraska, Missouri, West Virginia, Tennessee, Mississippi, Louisiana, and Ontario, Canada.

Dr. H. M. Parshley has shown that *H. beginii* is not a composite species, but represents only the nymphal stage of *M. hesperius*.

Metrobates cubanus, sp. nov. (Pl. II, Figs. 2*e*, 4*e*).

Smaller than the other members of the genus. Apterous form black, with bluish gray markings, sometimes with the broad median stripe of mesonotum not reaching to hind margin. Body not so strongly flattened nor as strongly widened anteriorly as in *spissus*, in this respect about the same as *hesperius*; the underside bluish and clothed with short hairs. Antennæ (Pl. II, fig. 2*e*) shorter and slenderer than in *hesperius*, blackish, the basal portion yellowish brown; segment I slightly curved at the base, obliquely truncate at the apex, clothed beneath with one long hair, segment III shortest. Anterior legs brownish black, clothed with numerous setaceous hairs, the apex of tibia somewhat enlarged and produced into a prominent tubercle within. Intermediate legs clothed only with dense pile. Pronotum in alate form large, tumid, depressed in front, rounded behind, almost subtruncate at the middle, the humeri prominent. In apterous form pronotum small, broadly depressed in the middle and there grayish or yellowish brown; mesonotum large, sinuate behind. Last venter almost twice as long as the preceding, yellowish brown at apex. First genital segment of male tumid and blackish above, distinctly depressed on each side and yellowish brown beneath; the clasper short and very distinctive (fig. 4*e*). Female larger and broader than male.

Length, 3.41-3.62 mm.; width, 1.61-1.92 mm.

Holotype: deälated male and *allotype*, apterous female and two *paratypes*, apterous males, Baracoa, Cuba, Aug. 1901, collected by Aug. Busck; types in collection of U. S. National Museum.

In general facies this species seems closest to *hesperius*, but the legs lack the hairy clothing characteristic of that species. As in other

members of the genus the first antennal probably bears several long setaceous hairs, but these except one, seem to be broken off in the specimens at hand.

Metrobates trux (Torre-Bueno) (Pl. II, Figs. 2*c* and 4*c*).

Trepobatopsis trux (Torre-Bueno), Ent. News, XXXII, 1921, p. 274.

Antennæ moderately stout, long, black, the basal portion of the first segment and sometimes of the second yellowish brown. Male clasper as in fig. 4*c*. Bluish color markings slightly variable. Winged form larger and brownish black.

Length, 4.00-5.00 mm.; width, 2.20-2.70 mm.

Originally described from specimens collected on Yampa River, Northwestern Colorado. The writers have a very long series of specimens from Corvallis, Oregon, and Parma, Idaho, also several winged and apterous examples from New Braunfels, Texas, June 22, 1917, collected by Dr. H. H. Knight. The latter differ from the Oregon and Idaho specimens in having the basal portion of the second antennal segment yellowish brown. The types in the collections of the University of Kansas and Mr. J. R. de la Torre-Bueno have been studied. The male of this species is easily recognized through the absence of the special armature or clothing peculiar to the male of each of the other species, except *cubanus*. From the latter it differs especially in the slightly swollen front femora and shape of the clasper.

Metrobates denticornis (Champion) (Pl. II, Figs. 3, 2*b*, 4*b*).

Trepobatopsis denticornis Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 158, Pl. IX, fig. 26, 26a; Drake and Harris, Ohio Jour. Sci., XXVIII, 1928, p. 273.

Antennæ moderately slender, black, the base of first and the proximal two-thirds of the third yellowish brown; segments II and IV subequal. Anterior femora of male armed on the lower edge a little before the middle with a very stout projecting tooth. Male claspers as in Pl. II, fig. 4*b*. Winged form darker and broader than apterous. Female larger and broader than male. Bluish marking somewhat variable in apterous form.

Length (apterous), 3.50-4.00 mm.; width, 2.00-2.20 mm. Winged form about 5 mm. long. This species was described from Mexico. Specimens are at hand from Texas, New Mexico, Mexico, and Guatemala.

Metrobates spissus, sp. nov. (Pl. II, Figs. 1*a* and *b*, 2*d*, 4*d*).

Size, color, and marking very similar to other members of the genus; ground-color black, with bluish gray markings and stripes, the head and pronotum usually with orange spots. Antennæ (fig. 2*d*) long, moderately stout; segment I black, the basal portion yellowish brown, beset beneath with a row of extremely long setaceous hairs, stouter and longer in male than in female; II with basal third brownish. Anterior legs shorter and stouter in male than female, black, the coxæ, trochanters, and basal portion of femora yellowish brown. Middle and hind legs entirely black. Mesosternum in male armed a little in front of coxal cavities with a stout, moderately long, pointed, slightly recurved, downwardly projecting, spine-like tubercle (fig. 1*b*).

Body broad, robust, strongly flattened, black, the bluish gray markings variable as in other members of the genus. Head black, tumid, with two oblique brownish spots near the base. Eyes large, black, extending beyond the sides of the pronotum. Pronotum strongly depressed on the disc, the slate-gray stripe frequently replaced by a large orange spot. Mesonotum very large, with a deep, line-like median groove, very deeply excavated in front, and strongly sinuate behind, its sides almost parallel and in front nearly touching the eyes. Coxal plates and metanotum marked with slate-gray. Venter slate-gray, the apex of last segment being yellowish brown. Female broader and more robust than male; last venter about as long as the two preceding, broadly and roundly emarginate; first genital segment beneath very strongly depressed, the clasper very distinct, fig. 4*d*.

Length, 3.60-4.00 mm.; width, 2.00-2.20 mm. Punta Gorda, British Honduras, 41 specimens. *Holotype* (male) and *allotype* (female) in collection of authors. The characters used in the key separate this species at once from any known form. It is the only species having the sternum armed in the male (Pl. II, fig. 1*b*.). The antero-lateral sides of the mesonotum are more strongly produced, the body distinctly more flattened, and the sides of the mesothorax (Pl. II, fig. 1*a*) are more nearly parallel than in any other species of the genus.

Telmatometra whitei Bergroth and *Potomobates horvathi* Esaki, both in the apterous form, were taken in asssociation with this very distinct and easily recognizable species.